as five per cent butyn may be well substituted. I use vaccines and the thermophore in my office without serious complaint at the time, and generally am rewarded by praise when results are quickly obtained. I use the vaccines almost invariably, choosing the mixed respiratory vaccine to be given subcutaneously or intramuscularly. I reserve the typhoid vaccine for intravenous use and, of course, the reaction is so pronounced when given by this route that it should not be done in one's office, but at the hospital or patient's home. I agree with Doctor O'Connor—use efficacious measures early.

SYPHILITIC PNEUMONIA*

By HARVEY T. OLSAN, M. D.
AND
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DISCUSSION *by H. W. Stephens, M. D., San Francisco; Norman Epstein, M. D., San Francisco; Barclay E. Noble, M. D., Los Angeles.*

SYPHILIS of the lung, according to present standards, is commonly regarded as a tertiary manifestation of the disease, associated with its later stages. The term in itself seems to suggest gummata, chronic interstitial pneumonias, and eventual fibroses. That an acute and early syphilis of the lung does exist and may prove relatively common, has but rarely been considered in the somewhat turbulent literature of the subject.

HISTORICAL

The first description of syphilis of the lung has been variously ascribed to Paracelsus, Paré, Laennec, Morgagni, Coesalpinus, Pinctor, and to many lesser luminaries. The earliest anatomical description is commonly accepted as that of de Paul [5] in 1850, discussing syphilitic pneumonia of the new-born. Porter [22] was the first American to write upon the subject.

During the sixteenth, seventeenth, and eighteenth centuries the diagnosis of "phthisis a lué vénerea" seems to have been fairly common until the discovery of the tubercle bacillus by Robert Koch. In its stead arose a great wave of skepticism. There was a general house-cleaning of museums; material taken from syphilitic patients was subjected to careful reconsideration; and specimens found under the label of pulmonary syphilis were again scrutinized. The literature that followed this renaissance did indeed seem to indicate a decided dearth of accepted and indisputable cases. The criteria, of course, were those commonly prevalent at that time.

Claytor,[4] for example, found no cases in 13,000 autopsies. In 1895, there were but ten accepted and labeled cases in all the collections in London.[3] Babcock [3] found but two in 6,000 autopsies in Chicago. Kolisko [3] observed but 100 in many thousands of autopsies in Vienna. Carlier [2] up to 1882 was able to collect but twenty cases in all, and Hiller [10] could add but eight more in the succeeding two years. Downing [7] found none in 3,000 autopsies at the Massachusetts General Hospital. Dorsey found none in several hundred postmortems; [3] Symmers [28] found two in 314 syphilitics; Stanley [26] found two in 1,000 cases; and Massia [3] but two in 6,000.

In contrast with this seeming rarity of the disease, however, stand the reports of Chiari,[3] who found one case in only 98 autopsies; Osler,[20] who found 12 in 280; and Peterson,[21] who discovered 11 in 88. In their opinions, the disease was, to say the least, relatively common. Other writers were even more venturesome in the face of such great doubt. Satterthwaite [25] states "the importance of syphilitic lung affections has been greatly underestimated by the physicians." Rossle, Flockeman,[3, 4] Porter,[22] and others, also went on record as affirming that such might be the case.

It should not seem at all unreasonable to suppose that syphilis can and does attack the lung at least as frequently as it attacks any other tissue of the body; for example, the cardiovascular or the central nervous systems. An explanation of the seemingly wide discrepancies in the figures surely must be sought. Carrera [3] attributes this aberration to the multiformity of the lesions produced by syphilis, to the variation in personal criteria for making diagnosis, and to the failure to recognize the basic lesion of the disease. Whereas previously the gumma had been accepted as the fundamental process of late syphilis, it remained for the extravagantly elaborate and painstaking studies of Warthin [30] to demonstrate that the gumma is *not* the fundamental lesion, but that a mild inflammatory reaction characterized by the infiltration of lymphocytes and plasma cells was so frequently associated with the finding of the *Spirochæta pallida* in tissue that its specificity might well be recognized. Such mild inflammatory changes may eventually lead on to fibrosis and atrophy in which process the gumma may play an intermediate rôle. Thus by careful and exhaustive search it was found that the *Spirochæta pallida* may be shown to be present in many hitherto unsuspected lesions, and that the tissue elaborated by its presence may be recognized microscopically without the necessity of finding the spirillum.

Diagnosis of the lesions of late syphilis, therefore, becomes a function of the microscope, and not of the naked eye alone. And this seems particularly applicable to syphilis of the lung. Carrera, employing these newer criteria, was able to make positive diagnosis of syphilis of the lung in twelve out of 152 specimens taken from syphilitic patients in the laboratories of the University of Michigan. He further surmises that this number could doubtless be greatly augmented had he but time to prepare and examine serially whole lungs, rather than the common and less time-consuming practice of making diagnosis from sections taken at random from the organ.

From the foregoing, many facts may be gleaned. To the most skeptical, who deny its existence, it should constitute adequate evidence that syphilis of the lung does occur. To those who class it as an exceedingly rare disease, it may be shown that

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* Read before the Dermatology and Syphilology Section of the California Medical Association at the sixty-first annual session, Pasadena, May 2-5, 1932.

multiformity of lesions, variation in personal criteria, and failure to recognize the characteristic pathology of late syphilis, have so depressed its diagnosis as to place it falsely in that category. Authors who fail to employ this newer knowledge similarly tend to underestimate the incidence of the lesion.

Carrera, in his conclusion, feels that it seems most probable that the lungs are involved in the mild general infection of syphilis to about the same degree that the other tissues and organs are. This, of course, leaves much room for enlargement and consideration.

CLASSIFICATION

There are many classifications of pulmonary syphilis extant, and they possess many similar and many differing points. Gumma and fibrosis seem to be common to them all. Fibrosis, however, is apparently given a multiplicity of names. The commonest of these is simple "fibrosis," also called "fibroid induration" by Claytor [4]; "dense fibrosis" by Hoxie [13]; "sclerosis" by the Karschners,[14] by Howard,[12] Rukstinat,[24] and Greer.[8] Stanley [29] terms it "diffuse" or "dense sclerosis," and Neuman[16] "diffuse lobar infiltration."

Bronchiectasis, suppurations, ulcerations, and gangrene are found in the classifications of Greer and of the Karschners. Syphilitic phthisis is included by Howard and by Rukstinat. Cavitation is described by Krohn.[17] Tylecote [29] adds a pulmonary arteriosclerosis, and a form which is primarily vascular. Carrera, in his more complete description, has shown that in addition to the gummatous and fibrous types there is a vascular type, and that arteritis is an important process in lung syphilis.

Each classification includes its pneumonia, but most authors fail to enlarge on whether their conception of the pneumonia is an acute or chronic process, and whether its scope is bronchial or lobar. From the context of their writings, however, it would seem that they consider the pneumonia as chronic, and usually of the interstitial type. A few writers, however, do mention an acute syphilitic pneumonia.

TIME RELATION OF PRIMARY INFECTION TO PULMONARY SYMPTOMS

The time lapse between the primary infection and the onset of pulmonary symptoms seems to have an important bearing on the nature and the symptom complex of the disease. In deference to the accepted opinion that pulmonary involvement is a late manifestation, we find most authors note a generous time lapse to intervene. The majority of reported cases occur more than five years after the initial infection, and certainly over three. Claytor [4] states the onset of pulmonary symptoms to be from one to twenty years after primary infection, and the most common being from five to ten years. In Rukstinat's experience,[24] as well as in Munro's,[18] the shortest period was three and one-half years.

A search for cases characterized by recent infection, thus more definitely placing the patient in the group of early syphilis, revealed but a few:

Henske,[9] three months.
Hauffman,[14] three months.
Zinn,[14] four months.
Stanley,[26] five weeks.
Ornstein,[19] four months after secondary eruption.
Dieulafoy,[14] ten months.
Downing,[7] twelve months.

In this group of cases, wherein the time lapse between chancre and appearance of pulmonary manifestations is of sufficient recency to be regarded as early syphilis, there does seem to be a different succession of events and symptoms differing from those exhibited by the usual type of lung syphilis as reported. There is more tendency for acuteness and more rapid evolution of pathology, such as might be anticipated in an early and acute infection.

THE RESPIRATORY TRACT IN SECONDARY SYPHILIS

Pulmonary manifestations that occur during secondary syphilis are but lightly regarded in the literature, as they are similarly lightly dismissed by the clinician. There are those who deny that such pulmonary phenomena are at all related to the syphilis. Fournier,[14] for example, believes that the dyspnea is purely nervous in origin. The predominating evidence, however, supports the contention that the pulmonary symptoms depend upon the secondary syphilis for their existence.

Early pulmonary pathology in association with secondary syphilis was first described by Dann under the title "Pulmonary Syphilis Precox." Reports from Rothschild, Schnitzler, Schirren, Gwyn, Chamtesse, and others, followed. Aside from a few roentgen-ray studies, however, but little is offered as indisputable confirmatory evidence.

The bronchitis of secondary syphilis was first described by Schnitzler [14] in 1880. Lancereux[14] advanced the hypothesis that the symptoms of the respiratory tract which occurred during the secondary stage of syphilis were dependent upon an exanthem of the mucous membranes, identical with that manifested by the skin. The Karschners [14] also feel that early pulmonary symptoms have as their basis the same exanthem, the result being a mild bronchitis and a secondary dyspnea. Wile and Marshall [32] express themselves similarly.

Stanley [26] states that the lesions of syphilis which affect the lungs and pleurae are numerous, and that they may be in the secondary or tertiary stages. The lesions due to secondary syphilis, however, are not of much clinical importance. This author is quoted merely because he typifies the current opinion.

SYPHILITIC PNEUMONIA

The next point, then, is that of whether, by direct attack or by virtue of toxins elaborated, the *Spirochæta pallida* is capable of producing a true pneumonia, and where, in classification of syphilis, would such a pneumonia be placed.

That pneumonia does occur in syphilitics cannot be disputed. Whether a portion of such pneumonias are dependent upon the *Spirochæta pallida,* however, remains to be established, and we find those who confirm and those who deny the con-

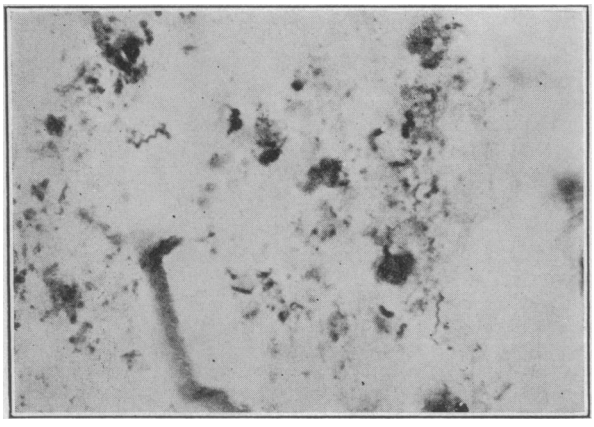

Fig. 1.—Section of sputum block from patient R. C., Levaditi stain, showing Spirochæta pallida.

tention. Wile and Marshall,[32] in their review of the literature, list the names of Councilman, Gambieni, Birch-Hirschfeld, Orth, Kaufman, Adami, and others, as being of opinion that pneumonia in syphilitics is not primarily luetic, but due to a secondary invader in the syphilis-weakened lung. On the other hand, they cite Neumann, Fowler and Godlee, Fournier, Dieulafoy, and Aufrecht among those who believe that a truly specific syphilitic pneumonia can and does occur. To the latter group may be added the Karshners.

Quoting from the Karshners[14]: "While the existence of syphilitic pneumonia is denied by some and affirmed by others, we believe that it occurs more frequently than is recognized." From Wile and Marshall[32] is taken the following: "We are inclined to subscribe to the view that resolving or activating changes in the lung, due to syphilis, may simulate very closely the picture of bronchopneumonia."

Rizer[23] and Douglas[6] both subscribe to the fact that an acute syphilis of the lung does exist, but feel that it is rare. Douglas further notes that the acute form may simulate and be indistinguishable from bronchiectasis, and from bronchopneumonia. Stokes[30] holds that syphilitic bronchopneumonia is a rarity.

Many roentgen studies of patients have been offered in the literature, but no true radiographic entity is yet accepted. Watkins,[34] for example, describes syphilitic bronchopneumonia as an irregular patchy affair, more irregular in outline than ordinary pneumonia, with more confluence, more mossiness of the edges, and more localization in the bases. In his opinion it may be confused with abscess, bronchiectasis, and with lobar pneumonia.

COMMENT

In the opinion of the authors, then, it seems quite probable that early syphilis can and does involve the respiratory tract quite frequently, and perhaps more frequently than is suspected. The evidence in favor of mucous membrane exanthemata as the cause of respiratory symptoms in secondary syphilis cannot well be denied. Positive proof, in fact, may be obtained from the report of Ornstein,[19] whose patient exhibited secondary syphilis and severe paroxysmal attacks of dyspnea. Mucous membrane patches were present in the pharynx, and by bronchoscopy identical patches could be followed down the trachea as far as could be seen. Further proof was adduced by the remarkable disappearance of attacks upon institution of vigorous antisyphilitic therapy, followed by reappearance when the patient allowed treatment to lapse, and a second remission when treatment was again instituted.

Granted that the mucosa of the trachea is subject to attack in the secondary exanthem, it also seems reasonable to suppose that this process by extension, or by direct invasion can involve the capillary bronchioles, or the alveoli of the lungs themselves. A process which in the pharynx can produce painfully sore throats, or which in the bronchi can evoke severe bronchitis, should likewise produce enough reaction to stimulate a definite tissue response when it involves the membranes of the lungs. The clinical picture produced by this response would be subject to much variation, dependent upon its intensity, localization, extent, and those mechanical peculiarities which might eventuate from an acute process occurring within the narrow confines of bronchioles or alveoli.

A mild, generalized mucosal involvement, for example, might produce such relatively mild pulmonary symptoms as to be lightly dismissed. Involvement of the bronchioles could produce a picture varying from mild bronchitis to that severe type of capillary bronchitis so closely allied to bronchopneumonia. A widespread and intense mucosal eruption might well produce a severe pneumonia, either broncho or lobar, dependent on its distribution. In fact, such a pneumonia might be so clearly of the usual bacterial types of infection that positive serology, and even frank syphilids, may be entirely disregarded in making the diagnosis and in treatment. Several instances which may fit into this category are found in the literature, most notably, the case of Henske.

Involvement of the respiratory mucosal surfaces being once established, the subsequent course depends on the natural tendencies of the disease plus, of course, the modifying factor of an active lesion within microscopically sized sacs, the lung alveoli. The predominating tendency, as in any mucocutaneous syphilid, is for spontaneous involution, even in the absence of treatment. In a certain proportion of the cases the natural tendency is for persistence, and with it, continuation of the pulmonary symptoms. The mechanical confinement of an acute process within the tiny alveoli may also favor continuation of the activity into a seemingly chronic or atypical pneumonia, and may also explain the mechanics of why caseation, fibrosis, and even cavitation may follow in the wake of an apparently acute pneumonia.

In the patients whose lungs fail to resolve promptly the predominant symptoms would naturally be the most apparent ones, such as the bronchitis; or, as in the case of Ornstein, the asthma; or, as in the case of Henske, the pneumonia. These may be so typical of commonplace, bacterial pulmonary infections that even the presence of

genital lesions, of a secondary cutaneous exanthem, or of strongly positive serology does not cast the shadow of suspicion upon syphilis.

The whole clinical picture may be even further divorced from the apparent realm of syphilis in those cases where the exanthem is limited to mucosal surfaces alone, with no telltale cutaneous eruption visible. Particularly can this be true in that totally unsuspected group of mucous membrane relapse, wherein all that is detectable to the examiner are the pulmonary findings and a positive serology, hardly enough to inculpate the *Spirochæta pallida.* And many cases in the literature do show a definite tendency to relapse, particularly emphasized by the patients of Henske and of Ornstein. For the lack of more convincing evidence, a diagnosis of bacterial infection of the lungs or respiratory tree is made, and the positive serology accepted merely as evidence of "syphilis, latent."

The possible rôle of early pulmonary syphilis in the later evolution of the disease may also be turned into evidence in favor of its existence. Moore [19] finds that in the large majority of cases of neurosyphilis, invasion of the central nervous system occurs within the first few months of infection, and occasionally during a second period of generalization of the disease characterized by clinical and serological relapse. Hopkins,[13] in a supplementary report, noted that patients with latent syphilis and negative spinal fluid rarely developed parenchymatous involvement of the central nervous system; and in the very few cases which did, the infection was mild.

If we align these facts with those herein discussed, acute pulmonary syphilis can well represent the period of invasion occurring early in the infection. This is usually followed by quiescence for the usual period of time, after which the more familiar symptom complex of late pulmonary syphilis may make its appearance. Or the pulmonary involvement may similarly occur during a second generalization of the spirochaete, characterized by mucous membrane relapse involving the mucous membranes of the lower respiratory system, with or without cutaneous manifestation.

Positive proof, unfortunately, cannot be produced in a disease so rarely fatal in its early stages as syphilis, and one so readily amenable to treatment. Any evidence proffered is subject to doubt and incredulity; it is only in the rare instance that surprising material may be discovered. Henske's [9] patient exhibited early cutaneous syphilis which was treated and followed in a short period by relapse. During the course of the relapse the patient developed an acute and very classical lobar pneumonia; in fact, the course and findings were so typical that syphilis was not suspected at all, and it was not until the lungs had been examined under the microscope that the *Spirochæta pallida* was found present, alone and in great profusion.

REPORT OF CASE

R. C., white, male, age forty-five, single, was admitted to the Los Angeles County General Hospital on August 29, 1930. In his history he had noted a penile sore of four weeks' duration; "cold," with cough of two weeks' duration, and onset of fever and weakness two days before admission. Positive findings on physical examination revealed a fairly sick man, flushed cheeks, large tonsils, and on his oral mucosa several yellowish grey placques surmounting reddish bases. Dullness over apices of both lungs, increase in transmission of voice and breath sounds, tubular breathing and moist râles anteriorly from the fourth rib upward; blood pressure, 110/66; rubbed off, infiltrated ulcer on underside of the penis. A clinical diagnosis of pneumonia, syphilis primary of the penis, and syphilis secondary (mucous membrane of throat) was made.

Laboratory data showed a normal urine, elevated white count, and 100 per cent inhibition in the Kolmer, and complete precipitation in the Kahn tests on blood serum. Darkfield examination of penile sore negative. X-ray of the chest revealed area of homogeneous density in the upper right lobe, consistent with lobar pneumonia, with early empyema to be ruled out.

On the third day after admission the patient was very sick and toxic, and reëxamination showed extension of the pneumonia over the entire upper third of the right lung. Diagnosis of lobar pneumonia was confirmed, and possibility of an acute tuberculous pneumonia considered.

On the fourth day the patient was delirious and ran a high fever. A visiting physician again confirmed the diagnosis of lobar pneumonia, with the suggestion that the slightly irregular clinical picture might be due to syphilis.

On the next few days the temperature remitted slightly, but on the ninth day a sharp rise occurred, accompanied by delirium. The white count at this time was 19,480. On the eleventh day, 0.3 grams of sulpharsphenamin was given intravenously. At this time there was still evidence of consolidation in the right upper lobe. On the following day there was another abrupt rise in temperature with increased toxicity, with white count at 26,350, 81 per cent polymorphonuclears. X-rays revealed a decrease in density in the right upper lobe, suggestive of partial resolution with a density extending downward, suggestive of extension of consolidation to the base.

On the fourteenth day a second dose of sulpharsphenamin, 0.3 grams, was given intravenously. On the following day the temperature dropped to 99 degrees Fahrenheit and definite improvement in the patient noted. X-rays on the eighteenth day revealed clearing of the base. A third dose of sulpharsphenamin was given on the twenty-first day. X-ray, then, revealed the lung fields to be clearer than at any previous examination, but still presenting irregular coarse granular infiltration in the right upper lobe, a high diaphragm on the right, and retraction of the mediastinum to the right. Under weekly injections of sulpharsphenamin, the patient made rapid progress, and by the thirtieth day all physical findings were gone, the white count normal, and temperature flat for some time. X-ray three months later showed disappearance of retraction of mediastinum, persistence of high diaphragm, and some increase in lung markings.

Blood cultures were persistently negative.

Sputum studies were interesting. They were consistently negative for the tubercle bacillus. On the twenty-first day a specimen of sputum was taken. At this time the mouth and throat were clean, and smears were negative except for some pus cells and bacteria. The specimen consisted of a large, solid mass of mucopurulent sputum, which was washed repeatedly and carefully, and placed in formalin. The contaminated outside was discarded and the internal portion stained by the Levaditi method and examined. The report from the pathologist stated that examination of this preparation revealed spirochetes presenting the morphology of the *Spirochæta pallida.*†

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† The authors wish to express their sincere thanks to Mr. A. A. Krajian for his kind assistance in preparing the tissue and in staining for spirochetes.

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DISCUSSION

H. W. Stephens, M. D. (384 Post Street, San Francisco).—The authors are to be congratulated on the excellent presentation of this somewhat hazy subject, namely, syphilis of the lung. The important literature concerning syphilis of the lung was reviewed in this paper, and the authors introduced thereby rather convincing proof that not only is an acute and early syphilitic infection of the lung possible, but probable. We are all familiar with the so-called "white pneumonia" of the new-born heredosyphilitic, and with gummata of the lung, which represents the late stage of syphilis of the lung. We are not familiar with the acute pneumonic form of which the authors speak because we have no means of identifying this type definitely. Patients, whom we believe to have this form of syphilitic disease, rarely, if ever, die and therefore we have neither gross nor histopathologic description. The clinical history, and the roentgen-ray and sputum studies are too variable to be helpful, so that our diagnosis of acute syphilitic pneumonia necessarily must be presumptive. The case presented by the authors as one of acute syphilitic pneumonia was so diagnosed because of the apparently favorable reaction of the patient to antisyphilitic therapy and the possible demonstration of the *Spirochæta pallida* in the sputum. A medical consultant in the same case justifiably questioned the diagnosis; surely the fact that a spirochete, resembling the *Spirochæta pallida,* was found in the sputum is not sufficient evidence upon which to make a diagnosis unless it is supported by careful cultural studies and animal inoculations.

The authors most ably presented and emphasized an acute disease which many of us undoubtely overlook many times a year; our knowledge of the acute manifestations of syphilitic pneumopathy is increased by this manuscript and an added stimulus is given to further investigative study.

❦

Norman Epstein, M. D. (450 Sutter Street, San Francisco).—Respiratory infections which could be attributed to syphilis have been very rare in our experience at the University of California. During the past ten years only one patient was observed in which a fibrosis of the bronchial tree of both lungs was present, apparently the end-result of a syphilitic infection.

In conjunction with the chest department we have been much interested in this subject. A number of patients with secondary syphilis have been examined clinically by Dr. S. Shipman, and also radiologically, but to date no definite evidence of syphilitic involvement of the lungs has been obtained. It was felt that bronchoscopic examination of these patients was too dangerous for the operator to be undertaken, although such an investigation would be of considerable interest.

The diagnosis of syphilitic infections of the respiratory tract is very difficult and surrounded with many uncertainties. But we must agree with the authors that they occur and probably more frequently than we are aware. The subject is also of considerable importance, particularly from the standpoint of therapy. In the presence of a respiratory infection, we are loathe to administer intensive antiluetic therapy, yet the patient with syphilis of the lung is in need of just such treatment. At times this problem can be quite baffling, but by making use of the improved methods for diagnosis of intrathoracic disease and by careful consideration of each individual case, fewer errors in therapy should be made.

The authors have presented a case with sufficient evidence to establish a diagnosis of syphilitic pneumonia and have thoroughly reviewed the subject. They are to be congratulated for bringing the condition to our attention.

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Barclay E. Noble, M. D. (523 West Sixth Street, Los Angeles).—The authors' careful review of the literature is very interesting and brings out clearly that we have few clinical criteria for diagnosing "syphilitic pneumonia," and that opinions are more numerous than facts.

The patient here presented was on the pneumonia service, so it was my good fortune to see him daily and discuss this very peculiar case with some fifteen different consultants, including Doctor Chambers. The chest men were specially interested in the marked retraction of the mediastinum to the side of the lesion in the first fourteen days of illness; the gradual "creeping" of the consolidation from apex to base with "clearing" behind; the sputum, which was scant, viscid, bloody, and raised only one to two times a day for one month; the clubbing of the fingers, beginning about the twenty-eighth day; and the greatly pro-

tracted course with the patient still having definite pulmonary changes (a band of opacity in the region of the upper right mediastinal pleura and persistent moderate retraction of mediastinum toward side of original lesion without visible fibrosis) at the time of his discharge on his one hundred fifteenth day.

The evidence for syphilitic pneumonia has been ably presented. Most of the men in the chest department were reluctant to accept this diagnosis, since this vagrant, though proud of his "conquests," denied intercourse for the six months preceding his penile lesion; several darkfield examinations of material from the penile lesion, lesions in mouth and sputum were negative, while fusiform bacilli and spirilla were found among other bacteria, in all smears; the Wassermann and Kahn reactions became negative after four injections of three-tenths of a gram of sulpharsphenamin and one dose (one-sixth gram) of mercury succinimid; the Fontana smears of the sputum were negative; and Krajan's Levaditi method was here used for the first time and so is open to question, particularly since many spirilla were present.

Dr. D. D. Comstock, senior attending man in charge of the patient, thought the most likely diagnosis was a pneumococcic pneumonia modified by secondary lues. (Pneumococci were found repeatedly in the sputum.) Personally I should like to think I had seen a "syphilitic pneumonia," but the presence of fusiform bacilli and spirillae in all examinations, and the prompt response to arsphenamins make me feel that a mixed infection with Vincent's organisms is a more likely diagnosis. Perhaps here the added organisms necessary for abscess formation were lacking.

In closing, I wish to express my appreciation to the authors for asking one with a different opinion to discuss their paper.

Doctors Olsan and Chambers (Closing).—The authors in closing refer to the points under discussion as having been adequately covered in the contents of the text. Acknowledgment is made in appreciation of the thoughts expressed by Doctors Epstein, Stephens, and Noble in their discussions.

THE LURE OF MEDICAL HISTORY*

JOHANN SIGISMUND ELSHOLTZ (1623-1688)†

CLYSMATICA NOVA (1665): ELSHOLTZ' NEGLECTED WORK ON INTRAVENOUS INJECTION

By Ethel Gladstone
San Francisco

IV‡

CHAPTER IX. *Inferences Concerning the Diseases to Which This Art Is Applicable.*—It is clearly evident from the establishment of these facts, not only that transfusion of blood is possible, but that it is permissible to inject in the veins of sick people medicinal and health-giving liquids, according to the circumstances. Still, there is absolutely no doubt that drugs injected in this manner can kill a man equally or more swiftly than the poisoned weapons of the Americans, of which frequent mention is made in books of navigation written about the New World. Nor should we believe that all of those very sudden and horrible symptoms which are told of in those books have been produced in the wounded save only through the disturbance of their blood.

But in considering drugs which are healing and suitable to human nature, I think that, first, we should immediately make a distinction between those whose use is more suitable either to the organs of the abdomen, or to the head and brain, and those which especially counteract diseases of the heart and therefore are applicable to the middle cavity of the body.

If you consider, you will see that cathartics, emetics, and narcotics are prominent among the former drugs. *Purges,* since they must cleanse the stomach, intestines, and kindred organs, are more easily taken through the mouth than through a vein. Hence Hippocrates insisted long ago in his time that the closest channels should always be chosen, and that material should be carried away through convenient places (Bk. I, Aphor. 21).

Emetics, to wash the stomach, are given in the same way; for the chest is cleansed at the same time. In this case, too, the mouth is the closer way to the stomach.

Narcotics, since their strength exerts itself chiefly in the head, go nearer through the heart by the use of the clyster than if taken through the mouth. But I did not easily dare to find out the legitimate and safe dose of these and the preceding drugs for a man. For by a decree of the Magistrates, experiments of this kind first had to be undertaken on those who, because of their crimes, were condemned to public execution.

As to the other type of drugs, which are particularly good for heart diseases, there is scarcely any doubt that their infusion in the heart can be beneficial. An enumeration of the principal heart diseases follows:

I. Loss of strength, Leipothymia, and Syncope. To alleviate these, a certain cordial tincture would be suitable. It is prepared from coral, pearl, bezoar stone, amber, *confectio alchermes, aurum potabile,* and similar material. Certainly it would be very desirable in syncope, when nothing can be taken by mouth, to inject a few drops of a tincture or essence of this kind through a vein to relieve the heart.

II. High Fevers, and Intemperate Heat of the Heart. Here some kind of delicate, cooling tincture would be excellent, especially if the patient is nauseated and refuses all remedies given by mouth.

III. Petechial Fever, Infection, and Poison Transmitted either through Food or Drink. The heart suffers greatly from all these, and it frequently happens either that the throat is constricted or its strength is so exhausted that nothing more can be poured in through the mouth. In this case orvieto dissolved in *aqua theriacalis,* or some other precious poison antidote, is of the greatest benefit and saves many people.

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